



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,280	10/17/2003	Jacques R. Tabanou	20.2892	9202
7590 02/17/2005				
Schlumberger Oilfield Service P.O. Box 2175 Houston, TX 77252-2175			EXAMINER WHITTINGTON, KENNETH	
			ART UNIT 2862	PAPER NUMBER

DATE MAILED: 02/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,280

Applicant(s)

TABANOU ET AL.

Examiner

Kenneth J Whittington

Art Unit

2862

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/3/04 and 2/10/04</u> . | 6) <input type="checkbox"/> Other: ____ |

Art Unit: 2862

DETAILED ACTION

Specification

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6, 11, 19, 24, 30, and 35 and any claims depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the requirement of a low or no dip situation when the ratio of $V_{zz}/2V_{xx}$ is relatively equal to the anisotropic ratio. As noted on page 19 of the specification, the ratio exists in a formation with low dip and the logging is performed at low frequencies. This is not included in the claim, thus in the situation wherein there is a medium or large relative dip, it is unclear of the claims' application.

Art Unit: 2862

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 14, 15, 27, 28, 32 and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Gianzero et al. (US 6,819,112). Regarding claims 1, 14, 27 and 32, Gianzero et al. discloses a computer having a memory (see Gianzero et al. col. 4, lines 19-31) having instructions for acquiring resistivity measurements from a triad of transmitter/receiver pairs, each pair oriented in one of the x, y and z planes relative to the logging tool (See FIG. 1 and col. 4, line 66 to col. 6, line 9) and deriving an electrical property of the formation from a difference measurement between a first resistive measurement from a longitudinal transmitter/receiver pair and second

Art Unit: 2862

resistivity measurement from a transverse transmitter/receiver pair (See col. 6, line 48 to col. 7, line 6).

Regarding claims 2, 15, 28 and 33, Gianzero et al. discloses the difference equation for the electrical property derived from $\alpha(\beta V_1 - V_2) = aV_1 - bV_2$, wherein a and b are chosen parameters (See col. 6, line 48 to col. 7, line 6).

Claims 10, 11, 29 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Savage et al. (US 4,636,731). Regarding claims 10 and 29, Savage et al. discloses a computer system having instructions (See col. 2, line 9 to col. 3, line 2) for acquiring a first resistivity measurement and a second resistivity measurement from transmitter/receiver pairs one oriented parallel and one transverse to the logging tool (See col. 3, lines 3-65, note radial and axial resistivity measurements) and deriving the anisotropic ratio from the first and second resistivity measurements (See col. 3, line 66 to col. 4, line 3).

Regarding claims 11 and 30, as is understood in view of the 112 rejection outlined above, Savage et al. as noted above teaches a method of finding the anisotropic ratio, which is the horizontal (axial) resistivity over the radial vertical (radial) resistivity. As noted by Applicants on page 20 of the

Art Unit: 2862

specification, the anisotropic ratio has the property that it is proportional to the ratio $V_{zz}/2V_{xx}$. Accordingly, since Savage et al. teaches the anisotropic ratio, it teaches the recited ratio.

Claims 12, 13 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Omeragic (US 6,584,408). Regarding claims 12 and 31, Omeragic discloses a computer having a memory (See Omeragic FIG. 5, item 210) having instructions for acquiring tri-axial resistivity measurements from three tri-axially oriented transmitter/receiver pairs (See FIG. 1 and col. 2, lines 9-29), and determining a dip angle from the tri-axial measurements (See col. 8, equation 27).

Regarding claims 13, Omeragic discloses the equation (equation 27) to determine the dip angle as noted above and further discloses a relationship of the couplings (See Omeragic col. 8, equation 25), the substitution of equation 25 into equation 27 provides the first recited equation and combinations thereof provide the remaining equations recited in claim 13. Thus, Omeragic discloses the features of this claim.

Art Unit: 2862

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 3, 4, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianzero et al. Gianzero et al. teaches each and every limitation of claims 1, 2, 14 and 15 as discussed above. However, Gianzero et al. does not disclose the particular parameters outlined in these claims. Nonetheless, it would have been obvious to use the parameters recited in claims 3, 4, 16 and 17. One having ordinary skill in the art would

Art Unit: 2862

have been motivated to do so in view of Gianzero et al. which states that the parameters for the equation should be chosen to optimize different aspects of the combination process (See Gianzero et al. col. 7, lines 1-6). Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See *In re Aller*, 105 USPQ 233, 235 (CCPA 1955).

Claims 5-7 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianzero et al. in view of Savage et al. Regarding claims 5 and 18 Gianzero teaches the limitations of claim 1 as discussed above. However, Gianzero et al. does not teach a specific method to find the anisotropy. Savage et al. teaches finding the anisotropy ratio by comparing the axial resistivity and the radial resistivity, both in relation to the logging tool (See Savage et al. col. 3, line 66 to col. 4, line 3). It would have been obvious to determine the anisotropy in the logging tool of Gianzero et al. using the method of Savage et al. One having ordinary skill in the art would have been motivated to do so because the anisotropy ratio can be used to determine information about the constituents of a formation (See Rosthal US 5,329,448, Background of the Invention).

Art Unit: 2862

Regarding claims 6 and 19, as is understood in view of the 112 rejection outlined above, Savage as noted above teaches a method of finding the anisotropic ratio, which is the horizontal (axial) resistivity over the radial vertical (radial) resistivity. As noted by Applicants on page 20 of the specification, the anisotropic ratio has the property that it is proportional to the ratio $V_{zz}/2V_{xx}$. Accordingly, since Savage et al. teaches the anisotropic ratio, it teaches the recited ratio.

Regarding claim 7 and 20 since the combination of Gianzero et al. in view of Savage et al. teaches deriving the electrical property, it teaches the electrical property being the horizontal resistivity.

Claims 8 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianzero et al. in view of Savage et al. as applied to claims 1-7 and 14-20 above, and further in view of Omeragic et al. Regarding claims 8 and 21, Gianzero et al. in view of Savage et al. teaches the limitations of claims 1-7 and 14-20, however, the reference do not explicitly disclose a determination of the vertical resistivity. Omeragic et al. discloses the deriving the vertical resistivity from the horizontal resistivity and the anisotropic ratio (See Omeragic et al. FIG. 4, block 115). It would have been obvious to use

Art Unit: 2862

the computation disclosed in Omeragic et al. in Gianzero et al. in view of Savage. One having ordinary skill in the art would have been motivated to do so to because such derivation equation is well known in the art to find the vertical resistivity based on known parameters, as taught in Omeragic et al.

Claims 9 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianzero et al. in view of Savage et al. and Omeragic et al. as applied to claims 1-8 and 14-21 above, and further in view of Rosthal. Regarding claims 9 and 22, the references noted teach the limitations of claims 1-8 and 14-21 as discussed above, however, they do not teach finding the resistivities by iterative solving as recited in claims 9 and 22. Rosthal teaches an iterative solving process wherein following determination of the horizontal and vertical resistivity, an iterative process is executed using refined horizontal and vertical resistivity values (See Rosthal col. 2, line 63 to col. 4, line 33). It would have been obvious to a person having ordinary skill in the art to use such process in order to acquire such resistivity values within a desired error (See Rosthal same paragraphs).

Art Unit: 2862

Claims 23, 24, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Savage et al. (US 4,636,731) in view of Omeragic. Regarding claims 23 and 34, Savage et al. discloses a computer system having instructions (See col. 2, line 9 to col. 3, line 2) for acquiring a first resistivity measurement and a second resistivity measurement from transmitter/receiver pairs one oriented parallel and one transverse to the logging tool (See col. 3, lines 3-65, note radial and axial resistivity measurements) and deriving the anisotropic ratio from the first and second resistivity measurements (See col. 3, line 66 to col. 4, line 3).

However, Savage et al. does not explicitly disclose acquiring tri-axial resistivity measurements. Omeragic discloses making tri-axial measurements using tri-axial transmission and reception coils (See Omeragic et al. FIG. 1). It would have been obvious for a person having ordinary skill in the art to use the tri-axial arrangement of Omeragic in the apparatus of Savage et al. to derive multiple measurements from the transmitter and receivers to determine multiple properties of the formation under examination (See Omeragic).

Regarding claims 24 and 35, as is understood in view of the 112 rejection outlined above, Savage et al. as noted above teaches a method of finding the anisotropic ratio, which is the

Art Unit: 2862

horizontal (axial) resistivity over the radial vertical (radial) resistivity. As noted by Applicants on page 20 of the specification, the anisotropic ratio has the property that it is proportional to the ratio $V_{zz}/2V_{xx}$. Accordingly, since Savage et al. teaches the anisotropic ratio, it teaches the recited ratio.

Claims 25, 26 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Omeragic in view of Gianzero et al. Regarding claims 25 and 36, Omeragic discloses a computer having a memory (See Omeragic FIG. 5, item 210) having instructions for acquiring tri-axial resistivity measurements from three tri-axially oriented transmitter/receiver pairs (See FIG. 1 and col. 2, lines 9-29), and determining a dip angle from the tri-axial measurements (See col. 8, equation 27).

However, Omeragic does not explicitly disclose finding the horizontal resistivity using a difference measurement. Gianzero disclose a difference measurement to measure the horizontal resistivity between a first resistive measurement from a longitudinal transmitter/receiver pair and second resistivity measurement from a transverse transmitter/receiver pair (See col. 6, line 48 to col. 7, line 6). It would have been obvious to a person having ordinary skill in the art to use such difference measurement in the apparatus of Omeragic to determine

Art Unit: 2862

a more rectilinear measurement insensitive to negative borehole contributions (See Gianzero et al. col. 3, lines 3-20).

Regarding claims 26, Omeragic discloses the equation (equation 27) to determine the dip angle as noted above and further discloses a relationship of the couplings (See Omeragic col. 8, equation 25), the substitution of equation 25 into equation 27 provides the first recited equation and combinations thereof provide the remaining equations recited in claim 13. Thus, Omeragic discloses the features of this claim.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Minerbo et al. (US 6,304,086) discloses a logging evaluation method wherein signal from the logging tool are subtracted. The other reference disclose various logging measurement techniques.

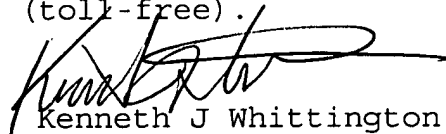
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J Whittington whose telephone number is (571) 272-2264. The examiner can normally be reached on Monday-Friday, 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be


Art Unit: 2862

reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Kenneth J Whittington
Examiner
Art Unit 2862

kjw


JAY PATIDAR
PRIMARY EXAMINER